

BRITISH COLUMBIA DEPARTMENT OF LANDS

FOREST SERVICE

HON. WILLIAM R. ROSS, K.C., Minister of Lands

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# BRITISH COLUMBIA TIMBER FOR PRAIRIE FARMS

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## HORSE BARNs

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FARM BUILDINGS SERIES

BULLETIN No. 4



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VICTORIA, B.C.

Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty  
1915

# British Columbia

## LUMBER, SHINGLES

and other Products of

Douglas Fir

Western Larch

Mountain Western Pine

Western Red Cedar

Western Hemlock

Spruce

Western White Pine



BRITISH COLUMBIA TIMBER FOR  
PRAIRIE FARMS.

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HORSE BARNS

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# The Lumbering Industry of British Columbia

## TO THE PRAIRIE FARMER.

In the forests of British Columbia there stands to-day more than half Canada's supply of commercial timber. Forest surveys made during recent years throughout the Province show 30,000,000 acres of timber ready for the market, and 45,000,000 acres of younger growth that will reach commercial size during the present century. The present merchantable stand is estimated at 400,000,000,000 feet board measure.

Taught by the experience of older countries, British Columbia has adopted a vigorous conservation policy and is carefully protecting her vast forest areas from fire and misuse.

The manufacture of lumber and other wood products is the most important industry of this forest Province. Each year 1,500,000,000 feet of timber is cut to supply the sawmills, pulp and paper mills, and other wood-using factories west of the Canadian Rockies. But the forests produce more wood each year than the mills can find markets for, and so much timber goes to waste. The most of the timber is public property; the prosperity of the Province depends very largely upon the lumbering industry; and it is therefore the duty of the Government to help secure the widest possible market for British Columbia lumber both in foreign countries and in Canada.

The main market for Western lumber to-day is in the Prairie Provinces of Canada. Each farm is, after all, a factory for agricultural produce and needs a well-built plant like any other factory. This means good buildings—a comfortable, convenient house, good barns, granaries, silos, fences, and shelter for machinery. The best material for this is wood. It is cheap, handy to use, warm, sanitary, and it lasts. British Columbia therefore desires to give the citizens of Alberta, Saskatchewan, and Manitoba full information concerning her forest products, asking them to bear in mind that these products are “grown and manufactured in Canada,” and that trade between the Provinces of the Canadian West is the surest foundation for our common prosperity.

### The Bulletins.

Valuable bulletins on farm buildings are now being issued by agricultural authorities all over Canada and the United States. The College of Agriculture of the University of Saskatchewan was engaged in this most useful work; the Government of British Columbia entered into a co-operative agreement with the University, and the series of farm bulletins listed on the last page of this booklet is the result. The agricultural information contained herein, and the plans and bills of material were prepared under the immediate supervision of Mr. W. J. Rutherford, Dean of the College of Agriculture, and thus give up-to-date and authoritative views on the agricultural subjects dealt with. The information concerning lumber is supplied by the Forest Service of the Government of British Columbia.

In the building plans, five things are aimed at in particular:—

- (1.) That they should be specially designed to meet Prairie conditions.
- (2.) That they should be simple and practical to meet the needs of the average farmer.

(3.) That ordinary stock sizes of lumber should be used throughout in order to keep the cost low.

(4.) That it should be easy for the farmer to make additions to the buildings whenever more accommodation should be needed.

(5.) That the details of the plans should be readily alterable to suit individual needs.

The plans printed in these bulletins show enough detail for them to be used as working plans. Any one wishing to obtain large-scale working plans can secure them at cost by writing to the **Chief Forester, Victoria, B. C.** A reference list of bulletins and of sources of agricultural information will be found on the last page.

#### **Note.**

While it is understood that the agricultural authorities in Alberta and Manitoba have already published pamphlets on farm buildings, and contemplate issuing others, it is believed that all Prairie farmers will be interested in the British Columbia bulletins, and editions for general distribution on the Prairies have accordingly been printed.

UNIVERSITY OF SASKATCHEWAN  
COLLEGE OF AGRICULTURE.

WALTER C. MURRAY, *President.*

W. J. RUTHERFORD, *Dean.*

## Horse Barns for Prairie Farms

BY

A. R. GREIG, *Professor of Agricultural Engineering.*

A. M. SHAW, *Professor of Animal Husbandry.*

### HORSE RAISING.

**F**ARMERS in general are more familiar with horses than with any other class of farm live stock. They are kept on almost every farm either to perform work, to breed from, or both. They furnish the motive power that operates the various farm implements and machinery. It is impossible to farm successfully under present conditions without them. There have been men in recent years who have endeavoured to eliminate the horse entirely from farming operations, and to perform all their work by machinery. These men have failed to accomplish what they set out to do. The power outfits are good in their place, but they have not as yet supplanted, and are not likely to supplant, the horse for general farm work.

Although all farmers own and use horses, comparatively few of them turn their attention to the raising of colts. They are content to use the mare as a work horse and buy from their neighbour or some horse breeder when a new horse is needed. This is an expensive practice. Not only is the farmer forced to make a considerable cash outlay, but he may have difficulty in getting a really good horse at any price.

There are good reasons why mares should be given the preference over geldings for farm work. A mare may be worked right up to within ten days or two weeks of foaling; in fact many of the best authorities prefer to have their brood mares handled in this way. Of course, judgment must be exercised in the kind and amount of work she is required to perform. Exercise is essential and regular work is the easiest and best way to furnish it to the brood mare, where only a few are kept.

Besides performing a good deal of valuable work, a mare will also raise a foal that will grow rapidly into money. Colts can

be reared very cheaply in Western Canada. Not only is our soil and climate entirely suitable, but oats—the grain that ranks highest as a horse feed—is one of our best crops. Roughage of all kinds, as oat straw, oat sheaves, and the various hays are all abundant, and make first-class food for the growing colts.

The best pure bred sire available should always be used for breeding. It is false conomy to use a low grade sire simply because he is cheap. It pays in the end every time to use a pure bred rather than a grade or scrub, even though the service fee may be a trifle higher.

Mares of a good draft type—the wide, deep, roomy kind—well cared for, will prove to be the most valuable animals on the farm, and the man who owns some of them at the present time is indeed fortunate. Every indication points toward much higher prices for horses. They are scarce, especially good ones of the draft type, which is the most useful and valuable as far as farm work is concerned. If such mares are bred continuously to the best draft sire available, it will only be a matter of a few years until the horses will have developed into a very even and uniform lot. They will have greatly increased in size, have better conformation and consequently a greater value, and their owner will be amply repaid, not only by the higher prices obtained for this class of horse, but also in the feeling of satisfaction that invariably goes with the handling of good live stock.

### HOUSING.

Both mares and work-horses are very often subjected to too close housing during the winter season. A majority of farm horses in Western Canada are idle during the greater part of the winter and we find a great difference of opinion as to the best methods of caring for them during that time. Some advocate turning them out to rustle for themselves at the straw stacks; others turn them out during the day time only and stable them at night; still others prefer to keep them stabled all the time.

The first method, it is true, saves work, and hundreds of horses are wintered in this way, but there is also some danger attached to it. In years when there is much frozen grain left in the field a good many cases of abortion are apt to occur among the brood mares; or if the horses have to subsist almost entirely on wheat straw numerous cases of impaction of the bowels will occur, usually resulting in considerable loss.



Of the two others methods employed the one where the horses are turned out during the day and stabled at night is much to be preferred. This practice is followed by a great many of the best horse breeders of the West. Although our winter climate is cold, the air is dry and horses can stand a very low temperature where such conditions prevail. There is a point, however, in this connection, that must be considered and that is the stable. Sometimes we find horses that have been allowed out all day stabled at night, eight or ten of them, in a small tight barn without any windows or ventilation system and with a tightly closed door. What is the result? The interior of the stable becomes damp and the walls coated with frost, and the horses themselves get heated up and when turned out again in the morning will suffer in consequence. They will not thrive when handled in this way, and such treatment usually results in the loss of one or more animals from pneumonia.

The barn in which horses are kept at night need not be especially warm—a building that is free from drafts and affords protection from storms is sufficient—but it must be dry. Horses will winter much better out on the prairie than in dark, damp, or badly ventilated barns.

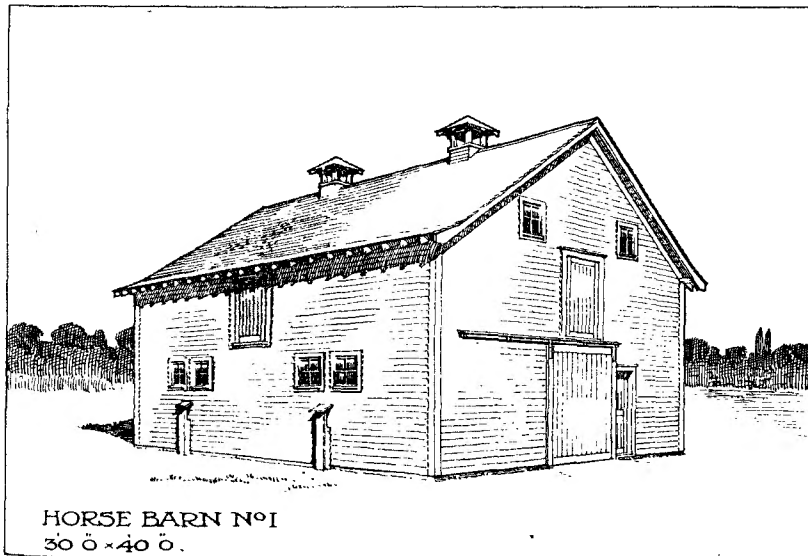


Figure 1. A small compact barn which will accommodate twelve to fifteen horses.

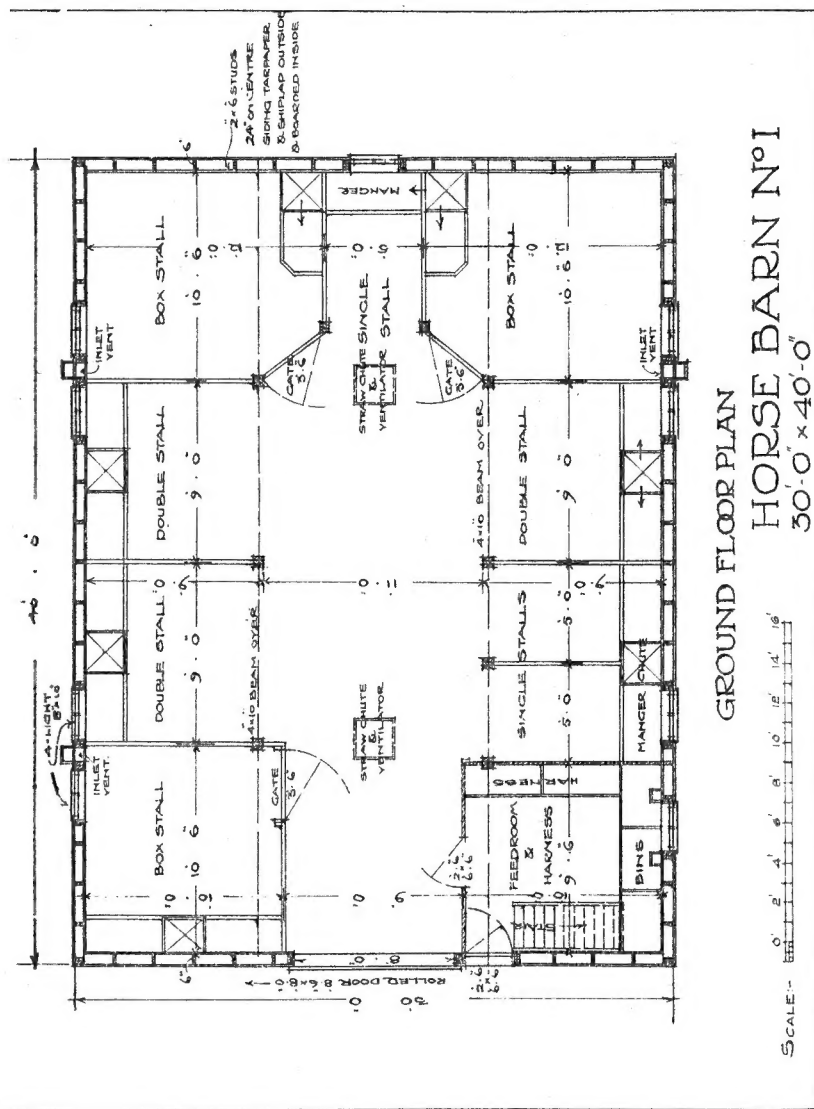


Figure 2. It is a well planned barn with all the available space utilized.

SCALE -

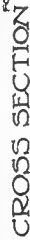


Figure 3. There is a hay chute from the loft in each manger.

**HORSE BARN No. 1.**

A plan of this barn is shown in Figure 2. It is 30 feet by 40 feet, and will accommodate twelve horses comfortably, or fifteen if two are placed in each of the box stalls. It is a well-planned barn with all the available space utilized. The double stalls are 9 feet in width, wide enough to allow a division to be put in if single stalls are preferred or required. The three single stalls are 5 feet wide and two of the box stalls are 10 feet 6 inches by 12 feet, the third being 10 feet 6 inches by 10 feet. All stalls and boxes are equipped with mangers connected by a chute to the loft as shown in Figure 16. A fair-sized feed and harness room is located in one corner in which are placed the feed bins, harness closets and a stairway to the loft overhead. The small outside door in the feed room is intended to be used as an entrance to avoid unnecessary opening of the large roller door in cold weather. Fresh air inlets are provided at the corners of the box stalls, and combination foul air outlets and straw chutes are located in the centre over the litter alley. The wide door enables a team to be driven into the stable or a manure wagon to be backed in for removal of the litter.

**Bill of Materials, Horse Barn No. 1.**

FRAMING LUMBER					
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
4	6	6	16	192	Sills.
6	6	6	14	252	Sills.
* 1	4	6	14	28	Corbels to cut 7 pieces 2' 0".
4	4	4	8	43	Cupola corner posts.
10	2	12	18	360	Stall division planks, to cut 20 pieces, 9' 0".
2	2	12	14	56	Stall division planks, to cut 4 pieces, 7' 0".
2	2	12	14	56	2" plank walls to feed room and one box stall.
7	2	12	12	168	Stall division planks, to cut 2 top boards on each stall division.
8	2	12	10	160	2" plank walls to feed room and one box stall.
8	2	12	8	128	2" plank walls to feed room and one box stall.
8	2	12	8	128	Stall division planks.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Barn No. 1.—*Continued.*

FRAMING LUMBER					Used for.
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	
2	2	10	16	53	Spiked together to form 4 x 10 beams under hay floor joists.
2	2	10	14	47	
6	2	10	12	120	
2	2	10	12	40	Stair strings.
4	2	10	10	67	Spiked together to form 4 x 10 beams under hay floor joists.
4	2	8	12	64	Ridge pole.
21	2	8	12	336	Hay loft joists.
42	2	8	10	560	Hay loft joists.
12	2	8	10	160	Manger bottoms.
17	2	8	10	227	Manger fronts.
2	2	8	10	27	Stair treads.
1	2	8	8	11	Stair treads.
8	2	6	18	144	Studs end walls.
46	2	6	18	828	Rafters.
8	2	6	16	128	Studs end walls.
24	2	6	8	192	Trimmings around window openings.
2	2	6	16	32	Trimmings around door openings.
* 8	2	6	16	128	Roof plates.
46	2	6	14	644	Studs side walls.
8	2	6	14	112	Studs end walls.
* 6	2	6	14	84	Ribbon under joists notched 1" into studs.
6	2	6	12	72	Corner T braces in hay loft.
* 4	2	6	12	48	Roof plates.
4	2	6	12	48	Trimming around door openings.
4	2	6	12	48	Studs end walls.
9	2	6	12	108	Strengthening rail on one side of all stall division planks; fixed diagonally from bottom of story post to under side loft floor joists.
1	2	6	10	10	Trimming around door openings.
12	2	6	10	120	Braces from roof plate to floor joists on every 3rd rafter.
2	2	6	10	20	Cupola stool.
12	2	6	10	120	Lookout rafters at eaves to cut 48 pieces 2' 6" long.
16	2	6	8	128	Studs end walls.
18	2	6	8	144	Posts under beams (2 pieces 2 x 6 with 2" blocking or stall division planks between, to form 6 x 6 posts).
1	2	4	18	12	Sliding door track fixing.
19	2	4	16	203	Collar ties.
4	2	4	8	21	Cupola rafters to cut 12 pieces 2' 6".

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

### Bill of Materials, Horse Barn No. 1.—*Continued.*

FRAMING LUMBER					
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
6	2	4	12	48	Framings and bearers to mangers.
2	2	4	10	13	Cupola plate.
6	2	4	10	40	Posts at corners and doorways to box stall and feed room.
6	2	4	10	40	Middle and top rails to box stall partitions.
6	2	4	8	32	Middle and top rails to box stall partitions.
8	2	2	16	43	Corner framing to ventilator and hay chutes.
14	2	2	14	65	Corner framing to ventilator and hay chutes.
14	2	2	12	56	Corner framing to ventilator and hay chutes.
7	2	2	12	28	} Fixed on outside wall to form groove for 2" stall divisions.
8	2	2	10	27	
8	2	2	10	27	Framing to bins and harness cupboards.
20	1	4	10	67	Slats to box stall partitions to cut 80 pieces 2' 6".
12	1	4	10	40	Rails on both sides of box stall slats.
12	1	4	8	32	Rails on both sides of box stall slats.
Total ft. board measure					
Framing Lumber.....7,235					

FINISH LUMBER					
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
1	2	8	12	16	} Window sills to cut 13 pieces.
2	2	8	10	27	
1	1	12	16	16	Inlet ventilator fronts.
4	1	12	10	40	} Window cheeks, to cut 18 pieces.
1	1	12	6	6	
1	1	10	6	5	Inlet ventilator tops.
1	1	8	18	12	Linings to door openings.
1	1	8	16	11	Linings to door openings.
* 6	1	8	16	64	Frieze side walls.
8	1	8	10	53	Fascia at gables.
1	1	8	10	7	Linings to door openings.
2	1	8	10	13	Chutes to feed bins.
2	1	6	16	16	Linings to door openings.
4	1	6	16	32	Corner boards.
1	1	6	16	8	Cover board to sliding door track.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Barn No. 1.—*Concluded.*

FINISH LUMBER					
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
2	1	6	14	14	Rails and braces to feed-room doors.
4	1	6	14	28	Rails to 3 box stall gates.
2	1	6	12	12	Ridge cover boards.
6	1	6	12	36	Window frames.
1	1	6	12	6	Braces to 3 box stall gates.
2	1	6	12	12	Braces to sliding doors.
2	1	6	10	10	Ridge cover boards.
4	1	6	10	20	Inlet ventilator sides.
4	1	6	10	20	Chutes to feed bins.
2	1	6	10	10	Rails to sliding doors.
8	1	6	10	40	Frieze at gables.
1	1	6	8	4	Rails to 3 box stall gates.
4	1	5	16	27	Corner boards.
1	1	5	14	6	Door casing.
3	1	5	12	15	Door casing.
2	1	5	12	10	Ridge cover boards.
2	1	5	10	8	Ridge cover boards.
3	1	5	10	13	Door casing.
2	1	5	8	7	Door casing.
3	1	4	14	14	Slats in top panel of box stall gates.
13	1	4	10	43	Window casing.
4	1	2	16	11	Door stops.
4	1	2	14	9	Door stops.
13	1	2	10	22	Window stops.

Total ft. board measure

Finish Lumber..... 723

1,600 feet, board measure, 1" T. and G. fir or larch flooring for hay loft floor.

300 feet board measure, 1" V-joint for doors, in 14 and 16 ft. lengths.

1,350 feet board measure, 1" shiplap for hay chutes and feed bins.

700 feet board measure, 1" shiplap for extract ventilator shafts.

2,800 feet board measure, 1" shiplap for all outside walls.

1,300 feet board measure, 1" shiplap for lining on inside of wall studs of ground floor.

1,400 feet board measure, 1" shiplap for ceiling of ground floor.

2,000 feet board measure, 1" roof board laid close. (If open boarding is desired, 1,400 feet board measure will suffice.)

3,000 feet board measure, drop siding.

16,750 British Columbia Red Cedar edge grain shingles (67 bundles).

13 rolls tar paper.

13 sash, 4 light 8" x 10"; outside size, 1' 8½" wide x 2' 1" high.

## HARDWARE.

8 pairs 8" T hinges for doors.

7 pairs 5" T hinges for hay chute doors.

9 pairs 4" T hinges for windows.

- 5 pairs 4" T hinges for feed bins and harness cupboard.
- 17 feet lineal roller door track and hangers for 1 door.
- 5 latches for box stall and feed room doors.
- 5 hooks and eyes, 6".
- 2 pieces  $\frac{3}{8}$ " x 24" round iron rod for dampers in ventilator shaft.
- 150 lbs. 4" common nails.
- 160 lbs.  $2\frac{1}{2}$ " common nails.
- 60 lbs. 2" flooring nails for siding.
- 85 lbs.  $1\frac{1}{4}$ " shingle nails, zinc clad or best quality galvanized.
- 35 lbs.  $2\frac{1}{2}$ " flooring nails.
- 9 window fastenings.
- 1 cubic yard of gravel for foundations under posts.
- 5 bags of cement.

**Note.**—This bill of material includes everything necessary for the building itself but does not include anything for scaffolding. Alternative quantities are given for two methods of roof boarding—close and open—the choice being left to the builder. Close boarding is better where there is no hay loft over the animals; where hay lofts are shewn open-boarding will answer.

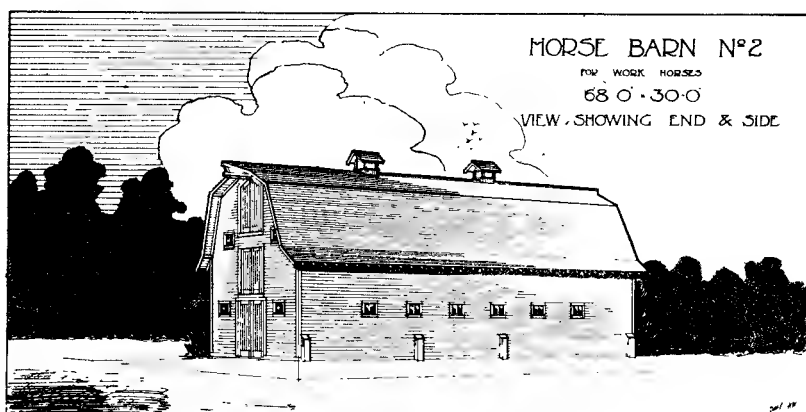


Figure 4. A good barn for stabling work horses. There is room for twenty-six head.

### HORSE BARN No. 2.

The ground floor of this barn, shown in Figure 5, is 30 feet by 68 feet. It is intended for stabling work horses and has 9 double stalls and 4 commodious box stalls, each equipped with sufficient manger room for two horses, making a total capacity of 26 head. The horses are fed their hay through chutes from the loft above. The chutes have an opening on either side so that each



# Horse Barn No 2

For Work Horses. 68' x 30'

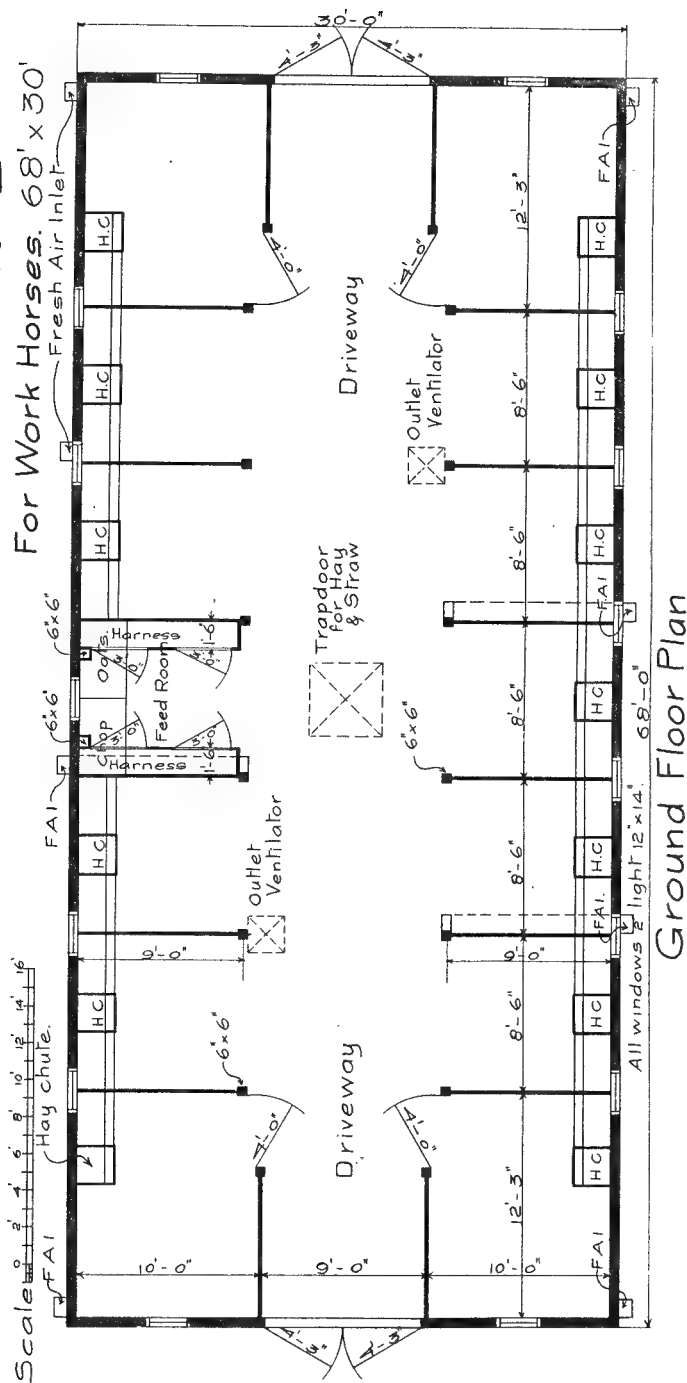


Figure 5. There are nine double stalls, four box stalls, and a feed and harness room.

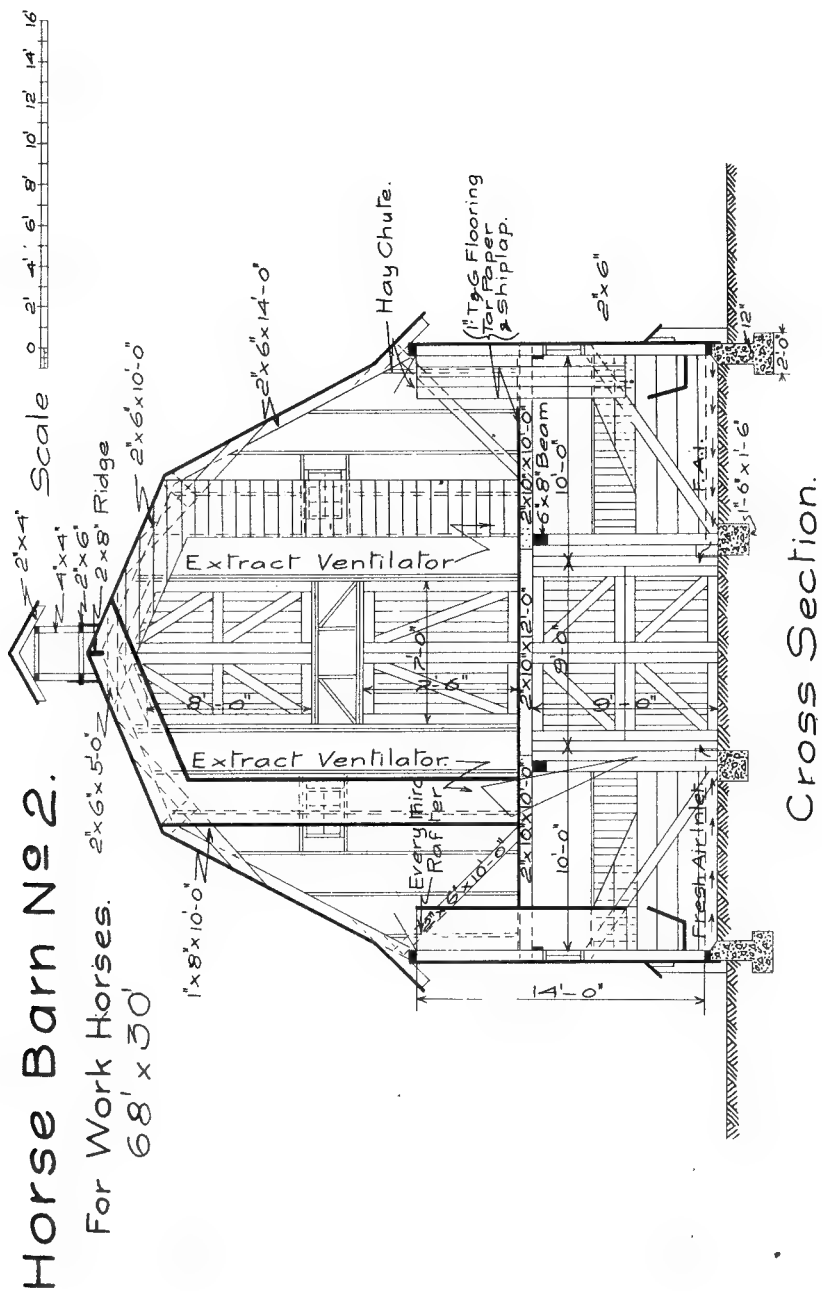


Figure 6. Fresh air is taken in through shafts or ducts along the partitions between the stalls.

horse may get his share. A detail of this type of manger and stall is shown in Figure 16. A feed and harness room is located in the middle, and contains the necessary bins, harness closets and also a stairway leading to the loft. The wide doors at each end allow a wagon to be driven through with bedding or for the purpose of cleaning out the stable. Ventilation is provided by eight fresh air inlets underneath the mangers and two foul air outlets over the driveway. To prevent a draft from striking the horses occupying the stalls opposite the inlets, the fronts of the mangers should run clear to the floor and the air be let in through holes bored in the fronts to one side of the inlets in the outer walls. The inlets should be very carefully made because if the horses are not properly protected cases of pneumonia may result. (See Figure 16 and also the section on Barn Ventilation).

### Bill of Materials, Horse Barn No. 2.

FRAMING LUMBER					
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
2	6	8	10	80	Projecting beam at each end of building for hay fork.
2	4	4	16	43	Cupola posts.
6	2	12	12	144	Top plank stall divisions.
18	2	12	10	360	Feed room walls.
40	2	12	10	800	Stall divisions.
16	2	12	8	256	Box stall divisions.
35	2	10	12	700	Hay loft floor joists.
70	2	10	10	1167	Hay loft floor joists.
12	2	8	18	288	} Spiked together to form 6" x 8" beams under hay loft joists.
12	2	8	14	224	
6	2	8	10	80	} Manger fronts and bottoms.
20	2	8	18	480	
* 5	2	8	16	107	Ridge pole.
2	2	8	12	32	Manger ends box stalls.
15	2	8	10	200	Manger fronts and bottoms box stalls.
*17	2	8	6	136	Struts from braces to rafter joints to cut 68 pieces 1' 6" long.
12	2	6	20	240	Studs end walls.
*15	2	6	16	240	Sills and plates.
12	2	6	16	192	Studs end walls.
4	2	6	16	64	Diagonal braces to end wall studs.
38	2	6	8	304	Trimmings around window openings.
5	2	6	16	80	Door frames.
6	2	6	14	84	Extra studs around door openings.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

## Bill of Materials, Horse Barn No. 2.—Continued.

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
*17	2	6	14	238	Sills and plates.
74	2	6	14	1036	Studs side walls.
4	2	6	14	56	Studs end walls.
74	2	6	14	1036	Lower rafters.
*10	2	6	14	140	Ribbon under joists notched 1" into wall studs.
1	2	6	14	14	Door frames.
2	2	6	12	24	Cupola stool.
6	2	6	12	72	Strengthening rail on one side of all stall division planks; fixed diagonally from bottom of story post to under side loft floor joists.
*16	2	6	12	192	Sills and plates.
8	2	6	12	96	Studs end walls.
14	2	6	10	140	Studs end walls.
* 1	2	6	10	10	Sills and plates.
32	2	6	10	320	Posts under beams; 2 pieces 2" x 6" with 2" blockings or stall division planks between to form 6" x 6" posts. (Note.—The ends cut off these ten-foot pieces are to form corbels on top of posts.)
74	2	6	10	740	Upper rafters.
19	2	6	10	190	Lookout rafters, to cut 76 pieces 2' 6" long.
18	2	6	10	180	Collar ties, to cut 36 pieces 5' 0" long.
8	2	6	10	80	Extra studs around door openings.
24	2	6	10	240	Braces on every third rafter from roof plate to floor joists.
5	2	6	10	50	Door frames.
2	2	4	14	19	Braces to lower doors to hay loft.
5	2	4	14	47	Rails to loft doors.
4	2	4	12	32	Cupola rafters.
2	2	4	12	16	Cupola plates.
10	2	4	10	67	Manger framing.
8	2	4	10	53	} Middle and top rail to box stall partitions.
8	2	4	8	43	
8	2	4	10	53	Stiles, upper doors to hay loft.
4	2	4	10	27	Braces to upper doors to hay loft.
4	2	4	10	27	Braces to ground floor door.
8	2	4	10	53	Stiles to ground floor door.
2	2	4	10	13	Locking bars to doors.
4	2	4	8	21	Locking bars to doors.
8	2	4	8	43	Stiles lower doors to hay loft.
8	2	4	8	43	Rails to ground floor doors.
*25	2	2	20	167	Bridging to joists.
26	2	2	16	139	Hay chute framing.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

**Bill of Materials, Horse Barn No. 2.—Concluded.**

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
* 8	2	2	16	43	Framing for feed bins and harness cupboards.
26	2	2	12	104	Hay chute framing.
16	2	2	12	64	Fixed on inside of walls to form groove for stall division planks.
20	2	2	10	67	Outlet ventilator framing.
140	1	8	10	933	Rafter braces on both sides of all rafters.
35	1	8	6	140	Cleats on braces to rafter joints, to cut 140 pieces 1' 6" long.
35	1	4	10	117	Slats to box stall partitions, to cut 2' 6" lengths.
25	1	2	10	42	} Door and window stops.
12	1	2	8	16	

Total ft. board measure

Framing Lumber .....13,544

**FINISH LUMBER**

No. of Pieces.	Inches Thick.	Inches Wide.	Long. Feet	Feet Board Measure.	Used for.
10	2	8	6	80	Window sills.
1	1	12	10	10	Inlet ventilator tops.
4	1	12	8	32	Inlet ventilator fronts.
15	1	12	4	60	Window cheeks.
4	1	6	10	20	} Frieze at gables.
4	1	6	14	28	
2	1	8	10	13	Feed bin chutes.
10	1	8	14	93	Frieze at eaves.
4	1	6	16	32	Door casing.
4	1	6	16	32	Corner boards.
5	1	6	16	40	Ridge cover boards.
4	1	8	16	43	} Fascia at gables.
4	1	8	10	27	
8	1	6	10	40	Door casing.
4	1	6	10	20	Feed bin chutes.
19	1	6	8	76	Window frames.
8	1	6	8	32	Inlet ventilator sides.
2	1	6	8	8	Door casing.
5	1	5	16	33	Ridge cover boards.
4	1	5	16	27	Corner boards.
19	1	4	10	63	Window casing.

Total ft. board measure

Finish Lumber ..... 809

\*Random lengths to make the same number of lineal feet will answer for items marked thus.

- 2,600 feet board measure, T and G flooring for hay loft floor.
- 2,300 feet board measure, 1" shiplap for hay loft floor.
- 4,500 feet board measure, 1" shiplap for all outside walls.
- 2,000 feet board measure, 1" shiplap for lining to inside walls, ground floor.
- 3,500 feet board measure, 1" shiplap for extract ventilator shafts, hay chutes and feed bins.
- 4,000 feet board measure, 1" roof boarding or shiplap.  
(If open boarding is desired, 2,800 feet, board measure, will suffice.)
- 750 feet board measure, 1" V-joint for all doors, 10' and 16' lengths.
- 4,750 feet board measure, siding.
- 35,000 British Columbia edge grain Red Cedar shingles (140 bundles).
- 25 rolls of tar paper.
- 19 sash, 2 light 12" x 14"; outside measurement, 2' 4½" wide x 1' 7" high.

#### HARDWARE.

- 26 pairs 4" T hinges for chute doors.
- 10 pairs 4" T hinges for feed bins and harness cupboards.
- 5 pairs 8" T hinges for box stall doors and trap door.
- 18 pairs 18" strong T hinges for all outside doors.
- 6 pairs iron sockets for locking bars to doors.
- 2 pieces ¾" round iron 24" long for pivots to dampers in extract ventilators.
- 35 5/8" x 10" bolts with nuts and double washers for foundations.
- 6 ½" x 5" bolts and double washers for locking bars.
- 15 pairs 4" T hinges for windows.
- 15 window fasteners.
- 20 hooks and eyes, 6".
- 4 hooks and eyes, 3".
- 76 lineal feet hay fork carrier track.
- 260 lbs. 4" common nails.
- 55 lbs. 2¼" flooring nails.
- 240 lbs. 2½" common nails.
- 100 lbs. 2" flooring nails for siding.
- 15 lbs. 2" finish nails.
- 175 lbs. 1¼" zinc-clad or best quality galvanized shingle nails.
- 32 yards gravel for foundation.
- 150 bags cement for foundation.
- 40 lineal feet 4" socketted drain pipe fresh air conduit at bottom of four stall divisions. Four 4" elbows for same.

**Note.**—This bill of material includes everything necessary for the building itself but does not include anything for scaffolding. Alternative quantities are given for two methods of roof boarding—close and open—the choice being left to the builder. Close boarding is better where there is no hay loft over the animals; where hay lofts are shewn open-boarding will answer.

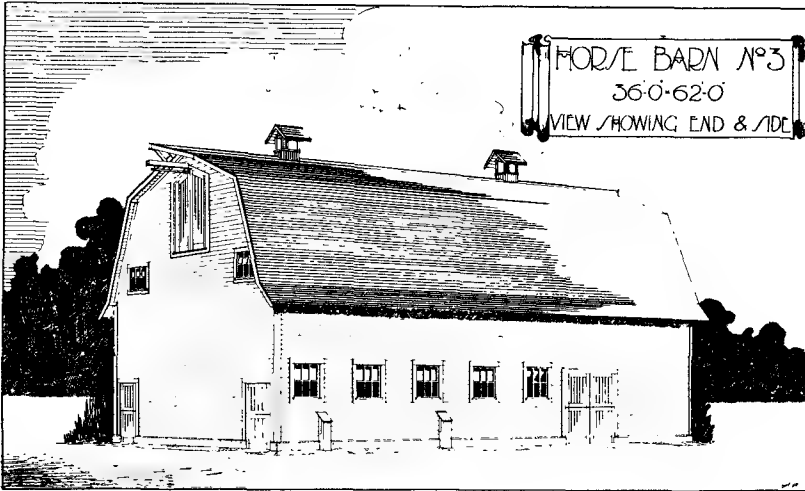


Figure 7. A well arranged barn, very comfortable for the horses and convenient to work in.

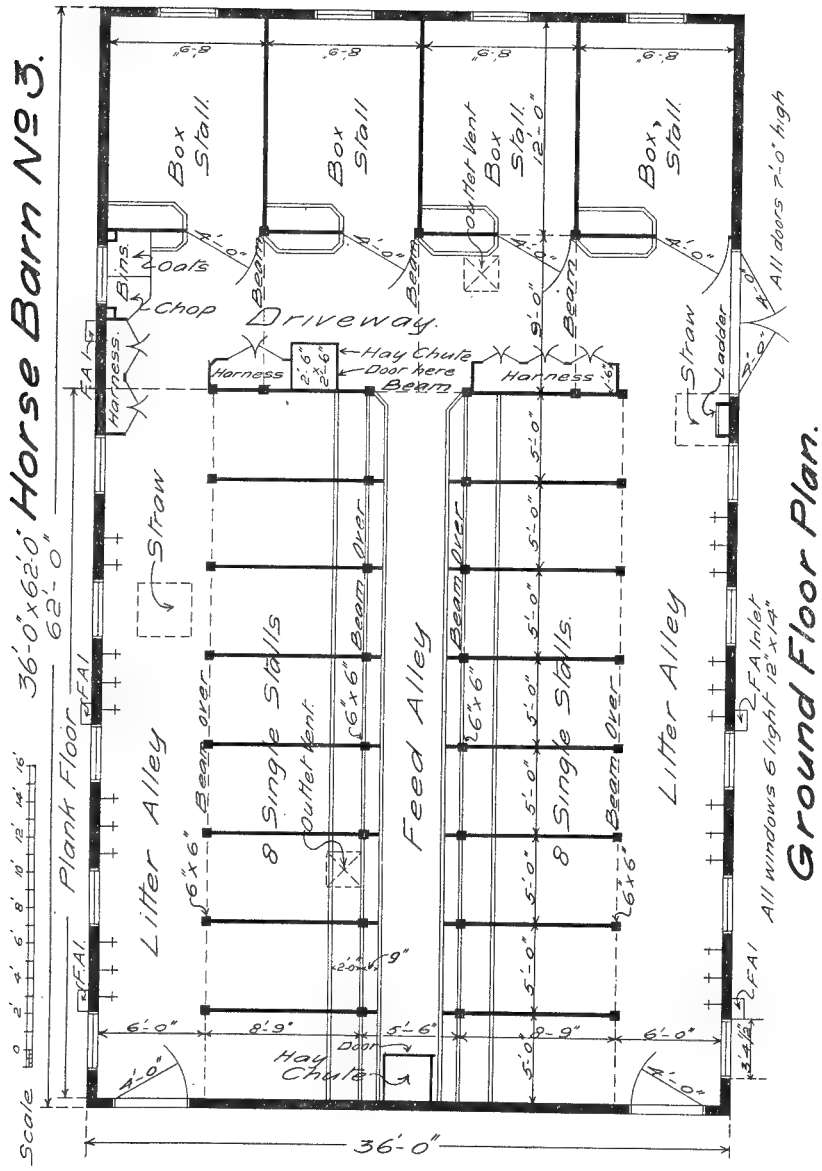
### HORSE BARN No. 3.

This barn is 36 feet by 62 feet with 16 single stalls and 4 box stalls (See Figure 8). The single stalls are the regulation width of 5 feet. The boxes, which are 8 feet 9 inches by 12 feet, may be found a trifle small, but if larger ones are desired the end of the barn can be divided into 3 box stalls, each approximately 12 feet square.

Plank floors are shown for all the single stalls, feed and litter alleys while earth may be used in the driveway and the box stalls.

The 4-foot doors at the end of the litter alleys are wide enough to admit a horse and stone boat. They can be driven clear around and out the other door if desired. The box stalls may be cleaned directly into a wagon, which can be backed into the driveway through the 8-foot double doors.

The manger equipment of this barn is worthy of note. It is shown in detail in Figure 10. Mangers of this kind enable the attendant to feed all the horses easily from the feed passage and at the same time prevent the horses from throwing their feed out









*Details of Doors to Hay Chute  
Horse Barn No 3.*

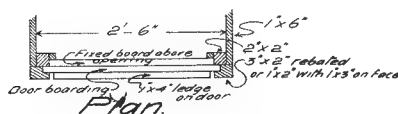
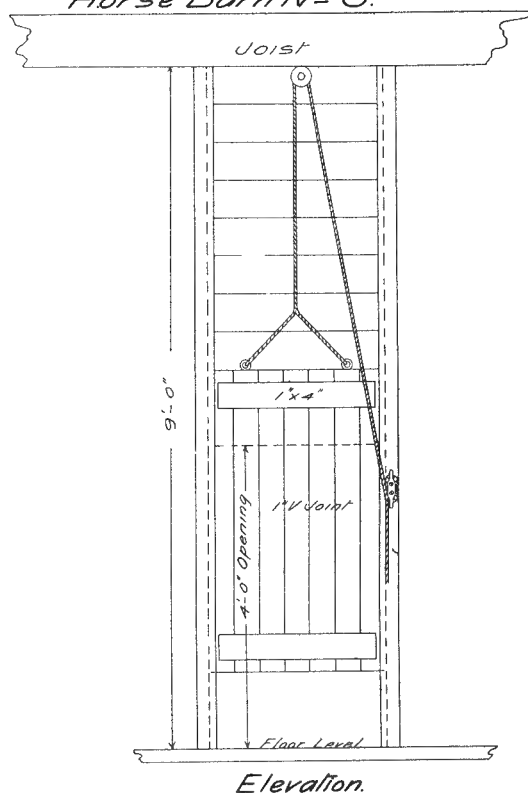


Figure 11. Chutes like this keep the hay clean, and the air free of dust.

The feed bins are located at the farther end of the driveway, each one being connected by a chute to a larger bin in the loft. The hay is brought down in chutes 2 feet 6 inches square, one at either end of the feed alley. These chutes can either be closed in all the way to the floor of the passage with a door for removal of the hay, (See Figure 11), or may be simply brought down to within about

two or three feet of the floor and left open. In either case the chute will act as a self feeder if kept full of hay and will keep the air free of the dust which invariably fills it when dry hay is dropped through a trap door in the ceiling to the floor of the stable.

Some harness pegs are shown on the walls behind the horses. This space may be boxed in if desired, but for harness that is in use every day the simple peg or hook on the wall is about the handiest arrangement for a farmer to use. For harness that is not in use regularly and for some of the better sets three harness closets have been provided.

Altogether this barn is well arranged and is a very convenient building in which to work. It comfortably houses a comparatively large number of horses without crowding or undue waste of room. By making the single stalls 4 feet 4 inches to 4 feet 6 inches wide two more horses could be housed, but the stalls would be less comfortable. It is a mistake to economize at the expense of the horses' comfort.

### Bill of Materials, Horse Barn No. 3.

FRAMING LUMBER					
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure	Used for.
2	6	8	10	80	Projecting beam at each end of barn for hay fork.
*10	4	4	16	213	} Mud sills under plank floors.
*18	4	4	14	336	
* 9	4	4	12	144	
3	2	8	16	64	Ridge pole.
12	2	8	16	256	Spiked together to form 6" x 8" beams under hay-floor joists.
42	2	8	16	896	Hay floor joists.
3	2	8	14	56	Ridge pole.
9	2	8	14	168	Spiked together to form 6" x 8" beams under hay-floor joists.
4	2	8	12	64	Manger bottoms.
24	2	8	10	320	Manger bottoms.
17	2	8	10	227	Struts from braces to rafters, to cut 68 pieces 2' 6" long.
15	2	8	10	200	Spiked together to form 6" x 8" beams under hay-floor joists.
44	2	8	10	587	Hay floor joists over box stalls and driveway.
21	2	8	6	168	Hay floor joists.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Barn No. 3.—*Continued.*

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
3	2	8	6	24	Spiked together to form 6" x 8" beams under hay-floor joists.
8	2	6	22	176	Studs end walls.
6	2	6	20	120	Studs end walls.
2	2	6	18	36	Studs end walls.
15	2	6	16	240	Studs and braces end walls.
*20	2	6	16	320	Sills and plates.
4	2	6	16	64	Rafters over projecting hay-fork beam.
* 8	2	6	16	128	Ribbon under joists notched 1" into studs.
* 5	2	6	14	70	Sills and plates.
68	2	6	14	952	Studs side walls.
18	2	6	14	252	Studs end walls.
1	2	6	14	14	Framing to door and window openings.
136	2	6	14	1904	All rafters.
2	2	6	14	28	Cupola stools.
2	2	6	14	28	Ladder sides.
3	2	6	14	42	Door frames.
6	2	6	12	72	Studs end walls.
8	2	6	12	96	T braces across corners of hay-loft.
* 6	2	6	10	60	Sills and plates.
16	2	6	10	160	Studs end walls.
21	2	6	10	210	Trimming to door and window openings.
17	2	6	10	170	Lookout rafters at eaves, to cut 68 pieces 2' 6" long.
24	2	6	10	240	Stays on every third rafter from roof plate to hay floor joists.
74	2	6	10	740	Posts under beams; two pieces spiked together with 2" blocking and stall division planks between to form 6" x 6" posts 8' 8" long. The 1' 4" pieces cut off ends are to be used as corbels under beams.
16	2	6	10	160	Top rail stall division.
2	2	6	10	20	Door frames.
19	2	6	8	152	Framing to door and window openings.
34	2	6	6	204	Collar ties.
*10	2	4	16	107	Rails at top and bottom of 2" plank manger fronts.
2	2	4	16	21	Cupola posts.
2	2	4	14	19	Cupola plates.
* 4	2	4	14	37	Rails at top and bottom of 2" plank manger fronts.
10	2	4	12	80	Bearers under manger bottoms.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Barn No. 3.—*Continued.*

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
6	2	4	12	48	} Rails above and below slats on stall divisions.
4	2	4	10	27	
8	2	4	10	53	Gate posts of box stalls.
16	2	4	10	107	Rails over mangers to stalls at top and bottom of slats.
4	2	4	10	27	Cupola rafters.
3	2	4	8	16	Locking bars to loft doors.
* 10	2	2	16	53	} Framing for hay chutes, ventilator shafts, feed-bins and harness cup-boards.
* 18	2	2	14	84	
* 9	2	2	12	36	} Bridging to joists.
* 20	2	2	20	133	
2	2	2	10	7	Ladder treads.
32	2	2	10	107	Cleats on both sides stall division planks at top.
32	2	2	10	107	Fillets fixed on plank floor as guides on both sides of stall division planks.
136	1	8	12	1088	Braces on both sides of all rafters.
34	1	8	10	227	Cleats on both sides of 2" x 8" struts to cut 136 pieces 2' 6" long.
* 5	1	4	16	27	Rail at bottom of 1" manger back.
* 2	1	4	14	9	Rail at bottom of 1" manger back.
* 28	1	4	10	93	Slatted fronts over mangers to stalls.
25	1	4	10	83	Slats box stall divisions.
* 10	1	3	16	40	} Rails on both sides of 1" manger back at top.
* 4	1	3	14	14	
4	1	2	8	5	Door stops for box stalls.

Total Framing Lumber—13,116

## FINISH LUMBER

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
19	2	8	4	101	Window sills.
4	2	6	12	48	Door stiles.
4	2	6	10	40	Door stiles.
10	2	6	10	100	Door braces.
2	2	6	8	16	Door stiles.
16	2	6	4	64	Door rails.
8	2	6	6	48	Door rails.
* 5	1½	3	16	40	Rail on top of 1" manger back.
* 2	1½	3	14	14	Rail on top of 1" manger back.
15	1	12	6	90	Window cheeks.
8	1	8	16	85	Frieze at eaves.
4	1	8	16	43	} Fascia at gables.
4	1	8	14	37	
4	1	6	16	32	Corner boards.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Barn No. 3.—*Concluded.*

FINISH LUMBER					Used for.
No. of Pieces	Inches Thick.	Inches Wide.	Feet Long	Feet Board Measure.	
3	1	6	16	24	Door casing.
8	1	6	14	56	Frieze at gables.
2	1	6	10	10	Door casing.
19	1	6	10	95	Window frames.
4	1	5	16	27	Corner boards.
5	1	5	16	33	Ridge cover boards.
5	1	4	16	27	Ridge cover boards.
19	1	4	10	63	} Window casing.
19	1	4	6	38	
1	1	2	16	3	Door-stops.
3	1	2	14	7	Door-stops.
19	1	2	10	32	Window-stops.

Total Finish Lumber.....1,173

960 feet board measure, 2" plank in 6' or 12' lengths for litter alleys.

480 feet board measure, 2" plank in 6' or 12' lengths for feed alleys.

640 feet board measure, 2" plank floor, in 4', 8' or 12' lengths (all to cut 4' long) for back portion of stalls next litter alley.

800 feet board measure, 2" plank in 10' lengths for front portion of stall floors next mangers.

2,400 feet board measure, 2" plank in 6' and 12' lengths for stall divisions.

760 feet board measure, 2" plank in 14' lengths for manger fronts.

420 feet board measure, 1" V-joint for manger backs.

400 feet board measure, 1" V-joint for harness cupboards.

180 feet board measure, 1" V-joint, 14' lengths for doors.

180 feet board measure, 1" V-joint, 10' lengths, for doors.

1,400 feet board measure, 1" shiplap for hay chutes, ventilator shafts and feed bins.

4,800 feet board measure, 1" shiplap for all outside walls.

2,100 feet board measure, 1" shiplap lining for walls on inside ground floor.

2,600 feet board measure, 1" shiplap under hay loft floor.

5,200 feet board measure, siding.

4,500 feet board measure, roof boarding, laid close. (If open boarding is desired 3,000 feet, board measure, will suffice.)

2,800 feet board measure, 1" T. & G. fir or larch flooring.

37,000 British Columbia edge grain Red Cedar shingles (148 bundles).  
24 rolls tar paper.

19 sash, 6 lights 12" x 14"; outside measurement 3' 4½" wide x 2' 9" high.

## HARDWARE.

300 lbs. 4" common nails for framing.

300 lbs. 2½" common nails for shiplap, etc.

- 60 lbs.  $2\frac{1}{2}$ " flooring nails.
- 105 lbs. 2" flooring nails for siding.
- 25 lbs. 2" finishing nails.
- 185 lbs.  $1\frac{1}{4}$ " shingle nails, best galvanized or zinc-clad.
- 15 pairs 4" T hinges for sashes.
- 15 sash fasteners.
- 2 pieces  $\frac{3}{8}$ " iron rod 24" long for pivots to dampers in ventilator shafts.
- 8 pairs 12" T hinges for stable doors.
- 8 pairs 18" T hinges for loft doors.
- 3 pairs iron sockets for locking bars to loft door.
- 3 barn door latches.
- 16 pairs 4" T hinges for feed bins, trap doors and harness cupboards.
- 6 button fastenings to harness cupboards.
- 4 iron barrel bolts, 8".
- 4 T hinges, 8", for box stall doors.
- 4 hooks and eyes, 6".
- 35  $\frac{5}{8}$ " x 10" bolts with nuts and double washers for foundation.
- 76 feet, lineal, hay-fork carrier track.
- 3  $\frac{1}{2}$ " x 5" bolts and double washers for locking bars.
- 4 screw-eyes for sliding doors to hay-chutes.
- 2 iron cleats for cords to sliding doors to hay-chutes.
- 2 small pulleys for cords to hay-chute doors.
- 30 yards gravel for foundation.
- 160 bags cement for foundation.

**Note.**—This bill of material includes everything necessary for the building itself but does not include anything for scaffolding. Alternative quantities are given for two methods of roof boarding—close and open—the choice being left to the builder. Close boarding is better where there is no hay loft over the animals; where hay-lofts are shewn, open boarding will answer.

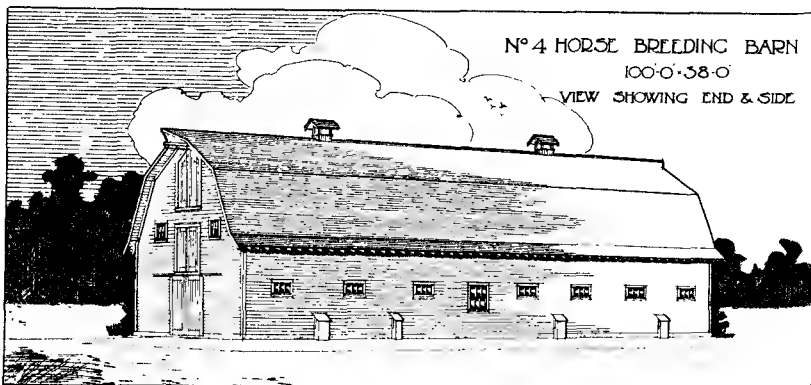


Figure 12. Designed for the man who is breeding draft horses, and who wishes to handle them in the best possible manner.



# Nº4 HORSE BREEDING BARN 100'-0" x 38'-0"

SCALE - 1" = 10'-0"

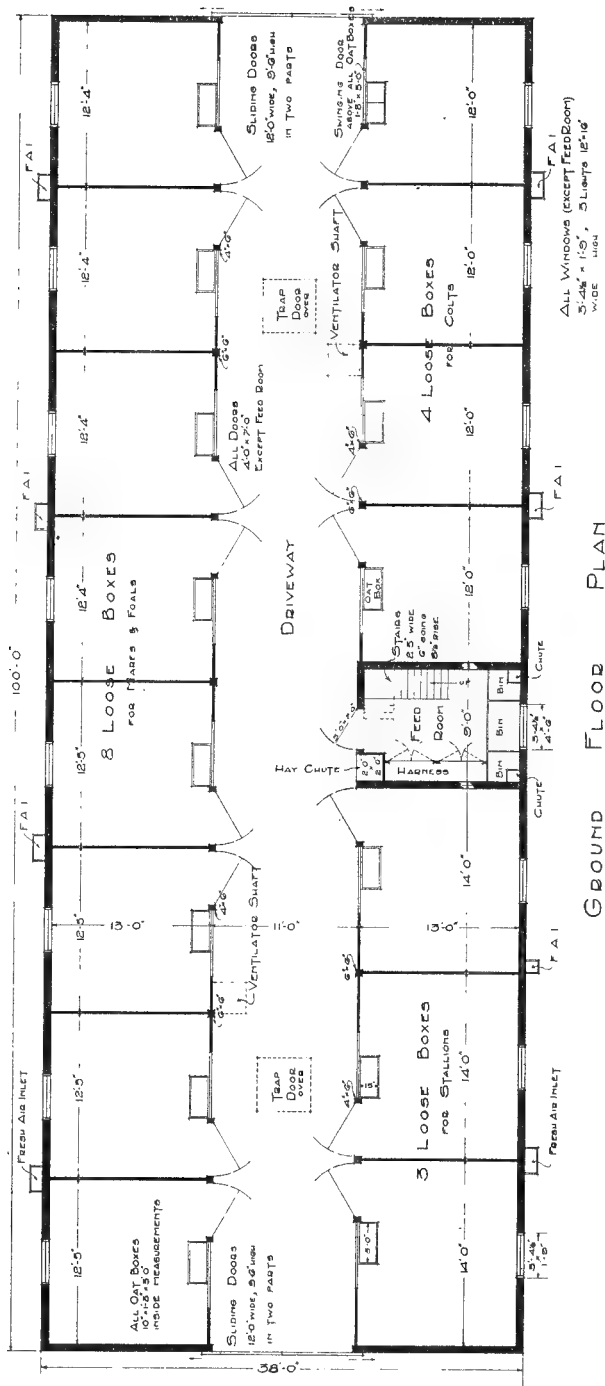


Figure 13. The entire ground floor is given over to fifteen large box stalls, a feed and harness room and the driveway.

# N<sup>o</sup> 4 HORSE BREEDING BARN . 100'-0" × 38'-0"

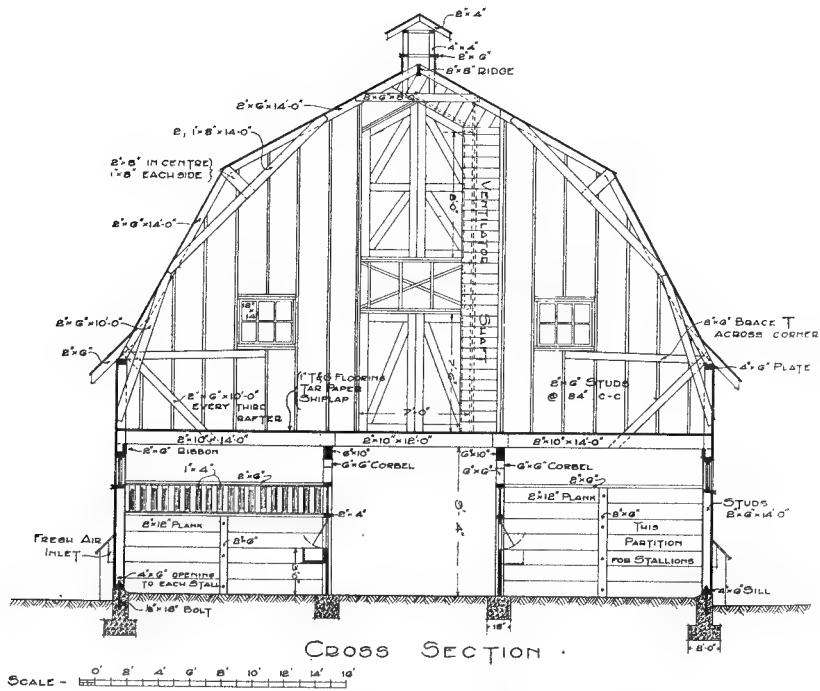


Figure 14. The swinging doors over the feed boxes allow feed to be put into the stalls from the driveway.

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**HORSE BREEDING BARN No. 4.**

Figure 13 shows the ground floor plan of a horse barn 38 feet by 100 feet. It is intended to meet the requirements of a man who is breeding draft horses, either purebred or good grades, and who wishes to handle them in the best possible manner. The entire ground floor is given over to 15 loose boxes, a feed room and a driveway. Twelve of the box stalls are approximately 12 feet by 13 feet, a suitable size for stabling mares and foals or colts of various ages; and three are 13 feet by 14 feet and are intended to be used as stallion boxes. These stalls are all equipped alike as regards mangers, doors and height of partitions, the only difference being that the three intended for stallions are slightly larger than the others. The feed boxes are 3 feet long, 1 foot 3 inches wide and 10 inches deep (inside measurements). They are not intended for hay, but only for grain, cut feed or mashes. Instead of being placed in the corner of the stall as is usual, they are placed about the middle of the front partition, near the stall door. This leaves room for hay and roughage to be placed between the feed box and the corner of the stall, and thus to some extent prevents the horse from trampling the hay. Another advantage of the size and placing of the feed box is that if necessary it is possible to keep a couple of two year old colts or even three yearlings in one stall, and they can all feed from this three foot manger. They could not do this if it were in the corner of the stall.

It is intended that all hay and in fact all roughage be fed on the floor. This may not meet with the approval of all, but where the feeding is carefully done it will be found to give entire satisfaction. If a careless feeder throws in too much roughage, naturally some will be wasted, but even this is offset by the fact that the foals and colts develop much better when allowed to eat from the ground.

A feed door 5 feet wide and 20 inches high is placed horizontally in the stall partition in front of the feed box, and extending 2 feet

beyond it so that hay as well as grain may be fed through it. This door is hinged at the top to swing in and drops back into position by its own weight as soon as the feed is pushed through it. It requires no fastener. A horse cannot open it inward, and stops on the partition prevent it from being pushed outward, so it simply hangs in position forming part of the wall.

This feeding arrangement enables the attendant to feed the entire stable without entering a stall. Moreover it leaves a perfectly smooth wall on the side next the driveway. This is an important point, for when the mares and colts are driven into the driveway from the fields or paddocks they are apt to injure themselves if there is anything to run against such as a swinging door or a projecting manger.

An earth floor is preferable to either cement or wood for box stalls. It is not only cheaper, but it keeps the horses feet in better condition. In single or double stalls, however, where the horse stands practically in the same place all the time, it is almost impossible to keep an earth floor clean and, therefore, cement or planks, or both, are to be preferred.

A feed room 9 feet by 13 feet is located near the centre of the barn, and contains feed bins, a harness closet and a stairway leading to the loft. The bins are connected by chutes to larger bins in the loft. An extra large window is placed over the central bin so that the feed room will be light at all times. This point is often neglected and in consequence a great many feed rooms are the darkest, dingiest places in the whole barn.

The driveway is eleven feet wide, and will allow a team and wagon to be driven through to clean out the boxes or to bring in bedding as required. At each end are hung roller doors.

The barn is well lighted, each loose box having a window with three 12 x 16 lights. Good ventilation is provided by the fresh air inlets between each two box stalls, and the foul air outlets

located over the driveway. At each end of the driveway is a trap door in the floor of the loft, which can be used for putting down either hay or straw as occasion demands. The large hay chute in the corner of the feed room is built in all the way to the floor except the last four feet in the side facing the driveway, which is left open for removing the hay. A chute of this kind does away with the great cloud of dust that is raised when hay is simply dropped through a trap door.

### Bill of Materials, Horse Breeding Barn No. 4.

FRAMING LUMBER					
No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
2	6	8	10	80	Projecting hay-fork beam at each end of barn.
* 2	6	6	12	72	Corbels on posts under beams, to cut 12 pieces 2' 0" long.
4	4	4	10	53	Cupola posts.
1	4	4	10	13	Posts to stairs.
1	4	4	8	11	Posts to stairs.
64	2	12	14	1792	Plank divisions to box stalls.
60	2	12	8	960	Plank fronts to box stalls.
15	2	12	10	300	Plank fronts to box stalls.
2	2	10	16	53	Stair strings.
102	2	10	14	2380	Hay loft joists.
51	2	10	12	1020	Hay loft joists.
15	2	10	10	250	Oat box fronts and sides.
* 7	2	8	16	149	Ridge pole.
3	2	8	14	56	Stair treads.
*27	2	8	8	288	Struts from 1" x 8" braces to joint of upper and lower rafters. (See detail, Figure 15.)
12	2	8	8	128	Rails at bottom of slatted partition next driveway.
15	2	8	6	120	Oat box bottoms.
8	2	6	22	176	Studs end walls.
4	2	6	20	80	Diagonal braces to end wall studs.
8	2	6	18	144	Studs end walls.
24	2	6	16	384	Studs end walls.
*20	2	6	16	320	Sills and plates all doubled to form 4" x 6".

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Breeding Barn No. 4.—*Continued.*

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
*13	2	6	16	208	Ribbon under joists notched 1" into studs.
*20	2	6	14	280	Sills and plates all doubled to form 4" x 6".
106	2	6	14	1484	Studs side walls.
216	2	6	14	3024	All rafters.
4	2	6	14	56	Corner braces to hay loft.
2	2	6	14	28	Upright rails bolted to 2" plank partition of stallion boxes.
2	2	6	14	28	Top rails of partition to stallion boxes.
20	2	6	14	280	Rails to stall partitions at top and bottom of slats.
8	2	6	14	112	Studs end walls.
8	2	6	12	96	Studs end walls.
4	2	6	12	48	Extra studs for all door openings.
15	2	6	12	180	Trimmings around window openings.
*20	2	6	12	240	Sills and plates all doubled to form 4" x 6".
* 2	2	6	10	20	Sills and plates all doubled to form 4" x 6".
8	2	6	10	80	Studs end walls.
1	2	6	10	10	Trimming around window openings.
36	2	6	10	360	Braces on every 3rd rafter from roof plate to floor joists.
106	2	6	10	1060	Braces on every rafter to wall studs.
4	2	6	10	40	Corner braces to hay loft.
25	2	6	10	250	Upright rails bolted to 2" plank partition of boxes for mares and colts.
2	2	6	10	20	Cupola stools.
8	2	6	10	80	Extra studs at door openings.
12	2	6	8	96	Extra studs at door openings.
33	2	6	8	424	Collar ties.
66	2	6	8	528	Story posts and gate posts under beams.
12	2	6	8	96	Rails at top of slatted partition, next driveway.
16	2	6	8	128	Trimming around window openings.
4	2	6	6	24	Trimming around window openings.
6	2	4	14	56	Sills and plates to feed room walls.
4	2	4	12	32	Sliding door track fixing.
3	2	4	10	20	Sills and plates to feed room walls.
18	2	4	10	120	Studs feed room walls.
7	2	4	10	47	Feed room floor joists.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Breeding Barn No. 4.—*Continued.*

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
8	2	4	10	53	Oat box bearers.
2	2	4	10	13	Cupola plates.
4	2	4	10	27	Cupola rafters.
4	2	4	8	21	Locking bars for loft doors.
*30	2	2	16	160	Framing for ventilator shafts, hay chutes, feed bins and harness cupboards.
*40	2	2	20	267	Bridging to joists.
24	2	2	14	112	Fixed on walls and posts as guides for partition plank of box-stalls.
8	1	12	4	32	Inlet ventilator fronts.
1	1	10	12	10	Inlet ventilator tops.
212	1	8	14	1979	Braces on both sides of upper and lower rafters.
*54	1	8	8	288	Cleats on both sides of 2" x 8" struts.
53	1	8	8	283	Ties from wall studs to lower rafter braces. (See detail AA, Fig. 15.)
16	1	6	4	32	Inlet ventilator sides.
140	1	4	8	373	Slats to upper portion of all stall partitions excepting those between stallion boxes.
15	1	2	14	35	Door stops.
19	1	2	12	38	Window stops.
15	1	2	4	10	Feed door stops.

Total ft. board measure

Framing Lumber .....22,117

## FINISH LUMBER

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
19	2	8	4	101	Window sills.
4	2	6	16	64	Stiles for loft doors.
15	2	6	14	210	Stiles to box stall doors, to cut 30 pieces 7' 0" long.
5	2	6	14	70	Rails for loft doors.
2	2	6	14	28	Braces for loft doors.
15	2	6	12	180	Rails for box stall doors to cut 45 pieces.
8	2	6	12	96	Braces for sliding doors.
8	2	6	10	80	Sliding door stiles.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.

Bill of Materials, Horse Breeding Barn No. 4.—*Concluded.*

No. of Pieces.	Inches Thick.	Inches Wide.	Feet Long.	Feet Board Measure.	Used for.
8	2	6	10	80	Stiles for loft doors.
4	2	6	10	40	Braces for loft doors.
15	2	6	6	90	Braces box stall doors.
8	2	6	6	48	Sliding door rails.
15	1	12	4	60	Window cheeks.
4	1	8	16	43	} Fascia at gables.
4	1	8	14	37	
*14	1	8	14	131	
2	1	8	10	13	Frieze.
4	1	6	16	32	Feed chutes.
*7	1	6	16	56	Corner boards.
3	1	6	14	21	Ridge cover boards.
8	1	6	14	56	Door casings.
4	1	6	12	24	Frieze at gables.
2	1	6	10	10	Cover boards for sliding door tracks.
10	1	6	10	50	Feed chutes.
4	1	6	8	16	Door casings.
19	1	6	8	76	Door casings.
7	1	5	16	47	Window frames.
4	1	5	16	27	Ridge cover boards.
19	1	4	14	89	Corner boards.
					Window casings.

Total ft. board measure

Finish Lumber..... 1,875

- 600 lineal feet, 1" x 2" fillet on both sides of slats to stall partitions.  
 1,200 feet board measure, 1" V-joint for doors and harness cupboards.  
 5,000 feet board measure, 1" T. & G. fir or larch flooring for hay loft and feed room.  
 6,600 feet board measure, siding.  
 6,600 feet board measure, roof boarding laid close. (If open boarding is desired, 4,400 feet board measure will suffice.)  
 4,400 feet board measure, 1" shiplap for hay loft floor.  
 3,300 feet board measure, 1" shiplap for lining on inside of wall studs, ground floor.  
 6,200 feet board measure, 1" shiplap for lining on outside of all wall studs.  
 2,000 feet board measure, 1" shiplap for ventilator shafts, hay chutes and feed bins.  
 63,000 British Columbia edge grain Red Cedar shingles (252 bundles).  
 30 rolls tar paper.  
 15 sash, 3 lights 12" x 16"; outside measurement 3' 4½" wide x 1' 9" high.

\*Random lengths to make up the same total number of lineal feet will answer for these items, and are cheaper to buy than specified lengths.



- 4 sash, 4 lights, 12" x 14"; outside measurement 3' 4½" wide x 2' 9" high.
- 1 window, 2 light, check rail, size between pulley stiles 3' 4" wide. 4' 6" high, for feed room.

## HARDWARE.

- 16 pairs 12" strong T hinges for box stall and feed room doors.
- 15 pairs 4" T hinges for windows.
- 15 window fasteners.
- 7 pairs 4" T hinges for feed bins and harness cupboards.
- 15 pairs 4" T hinges for feed doors to stalls.
- 15 door latches and sockets for box stall doors (latches of plain bar iron 12" long x 2" x ½" with bracket socket on post to hold latch).
- 1 thumb latch for feed room door.
- 2 pairs 8" T hinges for trap doors.
- 2 pieces ¾" x 24" round iron rod for pivoted dampers in ventilator shafts.
- 1 cleat for rope to hay chute sliding door.
- 2 screw eyes for rope to hay chute door.
- 1 small screw pulley to hay chute door.
- 2 cupboard door catches for harness cupboard.
- 8 iron sockets for locking bars to loft doors.
- 10 pairs 18" strong T hinges for loft doors.
- 108 feet lineal hay fork carrier track and hangers.
- 48 feet lineal single sliding door track.
- 8 door hangers.
- 4 hooks and eyes, 6".
- 50 lbs. 5" spikes.
- 450 lbs. 4" common nails for framing.
- 450 lbs. 2½" common nails for shiplap, etc.
- 100 lbs. 2½" flooring nails.
- 120 lbs. 2" flooring nails for siding.
- 30 lbs. 2" finish nails.
- 300 lbs. 1¼" shingle nails, galvanized or zinc-clad.
- 44 bolts ⅝" x 10", with double washers for bolting sills to concrete foundation.
- 4 ½" x 5" bolts with nuts and washers for locking bars.
- 104 bolts, ½" x 6", with double washers, for box stall partitions.
- 45 yards of gravel for foundation.
- 225 bags of cement for foundation.

**Note.**—This bill of material includes everything necessary for the building itself but does not include anything for scaffolding. Alternative quantities are given for two methods of roof boarding—close and open—the choice being left to the builder. Close boarding is better where there is no hay loft over the animals; where hay lofts are shewn open-boarding will answer.



### ROOF FRAMING.

Figure 15 illustrates roof framing suitable for barns from 32 feet to 40 feet wide. The roofs shown are economical in material, simple in construction and strong, and supporting posts are unnecessary, thus allowing a clear storage space in the hay-mow.

The illustrations give the lengths and sizes of the various roof timbers. It will be noticed that no timber is longer than 16 feet, or of greater size than 2" x 6" (except the short 2" x 8" struts).

One complete set of timbers for the roof should first be laid out on the hay loft floor, and all joints very carefully marked and cut. This complete set should then be used as a pattern for all the other roof timbers, which should be cut and stacked in piles before any are erected. In cutting off lengths of rafters, etc., in order to have all lengths accurate, always work to the pattern and not to the last piece cut.

### HORSE STALLS.

In Figure 16 is shown a detailed drawing of a horse stall, manger and hay chute suitable for use in any of the barns shown in this bulletin.

It is a good plan to make the plank floor of the stall in two sections, so that the back part, which always wears out sooner than the front, can be replaced when necessary, without the expense and trouble of relaying the whole floor.

The hay chutes have certain advantages, and also certain disadvantages, and can be put in or not as the builder desires; if they are not used, trap doors should be cut over the central alley. The advantages are that they save (1) the need of a feed alley in front of the mangers, with the extra width of barn and expense that would entail; or (2) the alternative labour of carrying hay to the mangers from the central alley. The objections are (1) the risk of fire if feeding is done at night by lantern light; (2) the possibility that they may interfere with the ventilation system.

To prevent the chutes from acting as ventilators, they should be built of double ply lumber, with tight fitting doors (in the hay loft), and the doors should be kept closed except when in use. The doors should be slightly narrower than the width of the chute, in order to prevent too much hay from being put in at once. Also the chutes

Figure 16. A good double stall with a hay chute to the loft. The floor is built in two sections, making it easy and cheap to replace.

should be built bell shaped, larger at the bottom than the top, with the inner layer of lumber running vertically, so that the hay will fall freely without sticking.

The method of ventilating these stalls, as shown in the drawing, is simple and cheap, though it is not claimed to be the best. The idea is to have the fronts of the mangers boarded down to the floor, thus forming a long continuous box underneath the mangers, (stall divisions not to run through underneath the mangers). Into this box fresh air is admitted by intakes of the usual kind through the barn wall; the fresh air is let out of the box into each stall by auger holes bored in the manger front. An objection to this plan is that draughts may be caused on the horses, although the current of fresh air is well broken up and distributed by the small auger holes.

A better method, though more expensive, is to let the fresh air in through a watertight shaft or duct carried either underneath the floor of the stall, or on the floor next the foot of the partition, to whatever point is most suitable; for example to the back of the partition, or to the passageway behind the stalls.

### BARN VENTILATION.

Fresh air ranks with sunlight as one of the prime necessities in any building used for the housing of live stock. Too much stress cannot be laid upon this point. Foul air is certain to cause disease. A stable lacking proper ventilation is neither sanitary nor comfortable. Low temperature does not mean pure air, and the purity of the air in a stable cannot be judged by its temperature.

The necessary conditions in a good ventilation system are: (1) No animal should be in a direct draught. (2) Each animal should get a sufficient amount of fresh air; no animal should be in a corner or a space where the fresh air does not circulate and from which the foul air is not carried off. (3) The currents of air should all be in the one direction—that is, away from the cold walls and towards the outlets. (4) The ventilators should be easily controlled so that in extremely cold weather the temperature need not be unduly lowered.

The Rutherford system of ventilation is used in all the barns shown in this bulletin. It is one of the best in use and is recommended by most authorities in Canada. In this system the fresh air is brought in through a number of small openings or ducts at the

bottom of the outside walls, so distributed that fresh air is diffused throughout all parts of the stable. These ducts are generally raised up inside to about eight inches above the floor, so that cold draughts will not run along the floor. As it is used and becomes warmed the air moves gradually to the centre of the building and up to the ceiling and out through the outlets. There should be no cross current nor tendency to bring air once breathed and warmed in contact with the outside wall. Usually about one outlet is provided for every four inlets.

Where the mangers are against the wall (as in the Horse Manger, Figure 16), it is sometimes difficult to introduce the air without causing a draught on the animals. In an experiment carried on at the Central Experimental Farm, Ottawa, to avoid this difficulty the fresh air was carried underneath the floor of the stall. Where this is done care must be taken to have the air shaft absolutely water tight. This can be ensured by using vitreous tile pipe with cemented joints. If the air is brought in at the manger it should be broken up into very small openings (auger holes) so as not to create a draught. If there is a feed passage along the wall it makes an excellent place for bringing in the fresh air.

The air should be brought in through small openings and at frequent intervals. An opening should not be larger than six inches by eight inches. Six or four inch tile pipes make good ducts. Eight square inches of inlet should be allowed for each cow two years old and over, and ten to twelve square inches for each horse. The inlets should be placed along the walls so that they will distribute the fresh air as far as possible throughout the entire stable. The inlets on the outside of the walls should be carried up high enough to be above the snow line and also to prevent dust and rubbish from blowing into them. The openings should be on the side walls of the inlet and not the face so that strong winds will not blow directly into them and affect the ventilation within the barn. Fly screens should be put over the openings.

The currents of air should be all in one direction—that is, towards the outlets. The air breathed out by animals is heavily laden with moisture. If this moisture-laden air is kept too long in contact with a cold wall or ceiling surface the moisture will be deposited in the form of hoar frost and the next mild day the walls will begin to drip. There is nothing so uncomfortable as a wet barn. When an

animal gets its coat wet it has to supply sufficient animal heat to evaporate the moisture. That this waste of heat—or in other words food—is considerable is shown by the fact that it takes five and one-third times as much heat to evaporate water as it does to bring it from the freezing to the boiling point. In this connection the construction of the walls is very important. Unless they have some form of insulation such as a dead air space, it is impossible to keep them dry, except by lowering the inside temperature to approximately the same as the outside. Double walls with a dead air space between will keep dry if there is a good circulation of air in the stable. No system of ventilation will keep solid stone or cement walls dry—especially in very cold weather—unless they are wood lined. (See Bulletin 78, Department of Agriculture, Ottawa.)

The outlets should be not less than 16 inches in diameter, and 24 inches is preferable. About 20 square inches of outlet space should be allowed for each animal. The outlets should be located as near the centre of the barn as possible. They should be built of two-ply lumber with tar paper between, to make them as air tight and as warm as possible. The air that is carried up the outlets is full of moisture, and if the outlet is cold it will soon collect a lot of hoar frost. The outlet should be built with as few angles as possible and be carried above the ridge in the form of a cupola. In the cupola it is preferable to have the sides open rather than covered with slats. If the roof is carried well over the walls there is not much danger of the snow and rain beating in the open sides.

The ventilation system should be easily controlled. The higher the ventilator is carried the greater the amount of air it will take out of the barn. Also the greater the difference in the temperatures between the inside of the stable and the outside, the more air will be carried off. Consequently it is necessary to control the outlets with a damper, the controlling cords of which should be brought down into the stable for convenience. The exact amount of opening for different weather conditions is soon learned and it is only a minute's job to adjust two or three ventilators before leaving for the night.

No ventilating system is automatic for all conditions of wind and temperature, but the Rutherford system can be operated with a minimum of attention and has proved to be most successful for conditions in the West.

BRITISH COLUMBIA DEPARTMENT OF LANDS.  
FOREST SERVICE.

HON. WILLIAM R. ROSS, K.C., Minister of Lands.

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## Wood as a Building Material.

Wood is supreme for **all-round usefulness**.

It is the **cheapest** building material obtainable.

It is also the **lightest**.

It is the **strongest**, weight for weight.

It is the **easiest** to work; **any one** can use it.

A wooden building is by far the **simplest** to **erect**.

Wood is **attractive** in **appearance** and has **great variety** and **beauty** for interior finish.

Unlike metal and masonry, wood is almost a **non-conductor** of **heat** and **cold**.

A building with wooden walls and a wooden shingle roof is **warm** in winter and **cool** in summer and **dry** all the time.

Wood is therefore particularly **suitable** for **houses** and **barns**.

Wood is very **durable** in all kinds of building work **above ground**.

It will give **generations** of **service**, especially if well painted where exposed to the weather.

For use in **contact** with the **soil**, as mud-sills or fence-posts, a preservative should be applied or a specially resistant wood such as Western Red Cedar should be used.

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# Woods to Use.

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## Grown in British Columbia---Manufactured in British Columbia.

Woods differ in their qualities of strength, hardness, and durability. Certain kinds are particularly suited for certain uses. It is important to use the right wood in the right place.

(1.) **General Building Work**—Douglas Fir, Western Larch, Western Hemlock, Mountain Western Pine, Mountain and Coast Spruce, Western White Pine.

(2.) **Framing and Dimension Timber, Posts, Beams, Rafters, Studs, Sills, Plates, Joists**—Light construction: Same as No. 1. Heavy construction: Douglas Fir, Western Larch, Western Hemlock.

(3.) **Rough Lumber or Sheathing not exposed to Weather (Inside Work or covered by Siding or Lath and Plaster)**—Any British Columbia wood.

(4.) **Rough Outside Sheathing exposed to Weather (Outbuildings, etc.)**—Douglas Fir, Western Larch, Mountain Western Pine, Western Red Cedar, Coast and Mountain Spruce, Western White Pine.

(5.) **Siding**—Western Red Cedar, Douglas Fir, Mountain Western Pine, Mountain and Coast Spruce.

(6.) **Roofing**—Western Red Cedar edge-grain shingles, with galvanized, zinc-clad, zinc, or copper nails.

(7.) **Flooring, Stair Stepping, Sidewalks**—Douglas Fir, Western Larch, Western Hemlock. Use edge-grain stock for hardest wear.

(8.) **Interior Finish, Panelling, Trim**—Douglas Fir, solid or veneer (a beautiful grain, superior to most hardwoods), Western Larch, Western Hemlock, Western Red Cedar, Mountain Western Pine, Western White Pine.

(9.) **Doors, Window-sash**—Douglas Fir, Western Red Cedar, Western Larch, Mountain Western Pine, Western White Pine.

(10.) **Fence-pickets**—Douglas Fir, Western Larch, Western Red Cedar, Mountain Western Pine.

(11.) **Piling, Cribbing**—Douglas Fir, Western Larch.

(12.) **Silos, Tanks**—Douglas Fir, Western Larch, Western Red Cedar.

(13.) **Ground-sills, Skids, Fence-posts, Poles, Conduits, Drains, and wherever Wood is in Contact with the Ground**—Western Red Cedar or creosoted wood. Use Douglas Fir or Western Larch where strength and hardness are essential.

(14.) **Furniture, Tables, Settees, etc.**—Douglas Fir, Mountain Western Pine, Coast or Mountain Spruce, Western White Pine, Western Red Cedar.

**Note.**—Western Hemlock is superior in every way to Eastern Hemlock—an entirely different tree—and should not be confused with it.

In ordering lumber, it is well to remember that short lengths (i. e., under 10 ft.) cost less than long, and where they will answer the purpose it pays to specify them. For example, it is cheaper to buy 6 and 8 foot lengths than to cut them out of 12 and 16 foot lengths.

**BRITISH COLUMBIA FOREST SERVICE BULLETINS.****Farm Buildings Series.**

1. Combination or General Purpose Barns for Prairie Farms.
2. Dairy Barns, Milk and Ice Houses for Prairie Farms.
3. Beef Cattle Barns for Prairie Farms.
4. Horse Barns for Prairie Farms.
5. Sheep Barns for Prairie Farms.
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8. Implement Sheds and Granaries for Prairie Farms.
9. Silos and Root Cellar for Prairie Farms.
10. Farm Houses for Prairie Farms.

**Timber Series.**

11. British Columbia Box Woods.
12. How to finish British Columbia Woods.
13. British Columbia Tie Timber.
14. British Columbia Dimension Timber.

The above bulletins and also further information concerning British Columbia lumber are obtainable free from the Chief Forester, Victoria, B. C. Of the Timber Series, Bulletin No. 12, "How to Finish British Columbia Woods," is of special interest to home builders and owners, carpenters, architects, and building contractors.

**OTHER PUBLICATIONS.**

Many publications and much useful information on farming and related subjects can be obtained on request from the various Government Public Service organizations of Canada, listed below.

**(1.) Alberta:**

Department of Agriculture, Edmonton.  
University of Alberta, Edmonton.  
Agricultural Schools at Olds, Vermilion and Lethbridge.  
Dominion Experimental Stations at Lethbridge, Lacombe, and Fort Vermilion.

**(2.) British Columbia:**

Department of Agriculture, Victoria, B.C.  
Dominion Experimental Farm, Agassiz, and Experimental Stations at Sidney, Salmon Arm, Summerland, and Invermere.

**(3.) Dominion:**

Department of Agriculture, Ottawa, Ont.  
Dominion Forestry Branch, Ottawa, Ont.

**(4.) Manitoba:**

Department of Agriculture, Winnipeg.  
Manitoba Agricultural College, Winnipeg.  
Dominion Experimental Farm, Brandon, and Experimental Station at Morden.

**(5.) Saskatchewan:**

Department of Agriculture, Regina.  
University of Saskatchewan, Saskatoon.  
Dominion Experimental Farm, Indian Head; Forestry Station, Indian Head; and Experimental Stations at Scott and Rosthern.

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Fifteen Hundred Million Feet  
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Flooring, Ceiling, Sash and Doors, Lath, Boxes,  
Cooperage, Wooden Pipes, Tanks and Silos,  
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Props, Elevator Cribbing, Tele-  
phone Poles, Piling, Railway  
Ties, Fence Posts, Pickets,  
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Furniture,  
and numerous other products.

# B. C. LUMBER

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### QUANTITY

The Province contains over 400,000,000,000 feet board measure, or over half the standing timber of Canada. There is plenty of it.

### QUALITY

The forests of British Columbia grow the best timber it is possible to obtain.

### USEFULNESS

The timber trees of British Columbia supply the

### MOST USEFUL OF ALL WOODS

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The lumber industry engaged in its manufacture is one of the best markets for the products of the farms of Western Canada. It is sound sentiment and sound business for Canadian farmers to buy

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